Space Weather Forecast

Issued on Monday 20 January 2025 at 00:27 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares expected with slight chance of X-class (Strong) flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with one Moderate class flare, from the sunspot region in the northwest. This is the most active of the nine regions currently on the Earth-facing disc, but has been showing some apparent weakening as it approaches the limb. The other regions have been less active with occasional Common-class flares observed. The largest of these was from the region just west of north-centre at 19/1708 UTC, which is dominated by a single leader and some much smaller peripheral spots. The largest region on the disc is located in the south-centre disc, however this has remained magnetically simple and inactive. Some growth was observed in small spots in the southwest, southeast and northwest, however these remain magnetically simple.

No Earth-directed coronal mass ejections (CMEs) were observed, however a filament eruption, which is where a line of plasma material is ejected from the Sun, was observed southeast of centre disc around 19/2300 UTC. It is currently too early to ascertain if a CME was produced.

Solar Wind / Geomagnetic Activity: Ongoing fast winds from a coronal hole were observed. Solar wind speed was slightly elevated to elevated (450-530km/s). Interplanetary Magnetic field, Bt, was Weak with the north-south component also Weak, but favouring a southward orientation. Geomagnetic activity was Quiet to Unsettled (Kp 1-3), but with Active (Kp 4) intervals 19/0600-0900UTC and 19/2100-20/0000UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected, with isolated Moderate-class flares expected. There is a slight chance of Strong-class flares.

Solar Wind / Geomagnetic Activity: There are no CME arrivals expected at Earth, however a glancing impact from the CME early on 18 Jan cannot be completely ruled out late on day 1 (20 Jan). Otherwise, current coronal hole sourced fast winds are expected to continue before gradually easing from late day 2 (21 Jan) onward. Mainly Quiet to Unsettled geomagnetic activity is expected, with a chance of Active intervals.

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background with no Solar Radiation Storms occurring. However, there is a slight chance of this rising in response to any significant flares that occur.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	75	70	70
Very Active	R3-R5 (X Class)	No	15	15	10	10

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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